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08/160,909 12/03/93 YAMAZAKI

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EXAMINER

ART UNIT PAPER NUMBER

1107

DATE MAILED: 02/06/96

D1M1/0206
SIXBEY, FRIEDMAN, LEEDOM & FERGUSON
2010 CORPORATE RIDGE, SUITE 600
MCLEAN, VA 22102

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☒ Responsive to communication filed on 9/6/95 ☒ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- ☐ Notice of References Cited by Examiner, PTO-892.
- ☐ Notice of Draftsman's Patent Drawing Review, PTO-948.
- ☒ Notice of Art Cited by Applicant, PTO-1449.
- ☐ Notice of Informal Patent Application, PTO-152.
- ☐ Information on How to Effect Drawing Changes, PTO-1474.
- ☐

Part II SUMMARY OF ACTION

- ☒ Claims 8, 11-13, 15-25 are pending in the application.
Of the above, claims 21 and 22 are withdrawn from consideration.
- ☒ Claims 1-7, 9, 10, and 14 have been cancelled.
- ☐ Claims are allowed.
- ☒ Claims 8, 11-13, 15-20, and 23-25 are rejected.
- ☐ Claims are objected to.
- ☐ Claims are subject to restriction or election requirement.
- ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
- ☐ Formal drawings are required in response to this Office action.
- ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
- ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
- ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).
- ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.
- ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
- ☐ Other

EXAMINER'S ACTION

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The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 8, 11-13, 15-20 and 23-25 are rejected under 35 U.S.C. § 103 as being unpatentable over Begin et al. in view of Miyachi et al., Nakayama et al., and Kawasaki et al., further in view of Codama, all of record.

Begin et al. disclose an apparatus for processing semiconductor wafers which includes satellite reaction chambers 60, 62, 64 and 66 disposed around the periphery of central chamber 14, see figure 1. A robot assembly 16 comprising arms 18, 20, and 22 is disposed in central chamber 14. Assembly 16 moves the substrate 12 to any position within the apparatus. Begin lacks anticipation only of disclosing that reaction

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chambers 60, 62, 64 and 66 comprise a light processing chamber, an etching chamber and a plasma doping chamber. However, apparatuses used for irradiating an amorphous silicon layer for dehalogenating and hydrogenating the layer, etching, and plasma doping are well known in the art, see Miyachi et al., Kawasaki et al., and Nakayama et al., respectively. Miyachi et al., in particular, disclose an apparatus which comprises a film-forming chamber 1 for forming an amorphous semiconductor film and a dehalogenating-hydrogenating chamber 2, see figure 5, for example. The two chambers are combined by a conveying device 13. The substrate 10 moves between the two chambers without being exposed to outside air. Note in Example 14 that the dehalogenation-hydrogenation is preferably performed by light irradiation using, for example, an ultraviolet laser, a visible light laser or a carbon dioxide laser, see column 18, lines 29-43. Codama discloses a method of fabricating a thin transistor which includes the steps of depositing an amorphous silicon layer, etching the silicon layer, the gate layer, and the gate insulating layer, plasma doping the silicon layer to form source and drain regions, see column 1, lines 42-46, and hydrogenating the layer. Therefore, in light of the semiconductor device

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process disclosed by Codama, it would have been obvious to the skilled artisan to include a light irradiation chamber, an etching chamber, and an ion introducing chamber in the known apparatus of Begin et al. in order to fabricate the device disclosed by Codama.

Claim 12 is rejected under 35 U.S.C. § 103 as being unpatentable over Begin et al. in view of Miyachi et al., Nakayama et al., and Kawasaki et al., further in view of Codama as applied to claim 8 above, and further in view of Yamazaki et al, U.S. Patent 4,888,305, of record.

Begin et al. and Miyachi et al. lack anticipation only of introducing the laser through a window provided in the wall of the chamber. Yamazaki et al. disclose an apparatus for photo annealing non-single crystalline silicon films in which light irradiation is carried out by irradiating the interior of a reaction chamber with an excimer laser through a window, see figure 1 and column 2, lines 38-41. Therefore, it would have been obvious to the skilled artisan that the laser light used in the known method of Miyachi could be introduced through a window provided in the wall of the dehalogenating-hydrogenating chamber thereby allowing control of the laser without exposing the substrate to outside air.

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Newly submitted claims 21 and 22 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 21 and 22 are drawn to an apparatus which has two (2) preliminary chambers, the originally - filed claims were directed to an apparatus with only one preliminary chamber.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21 and 22 withdrawn from consideration as being directed to a non-elected invention. See 37 C.F.R. § 1.142(b) and M.P.E.P. § 821.03.

Applicant's arguments filed September 9, 1995 have been fully considered but they are not deemed to be persuasive.

With respect to the rejections supra, Applicants have merely argued that Miyachi et al. fails to teach a preliminary chamber. However, the primary reference of Begin et al. clearly teaches the use of a preliminary chamber. Hence, the deficiency of Miyachi et al. argued by Applicants is clearly remedied by the combination of Begin et al. and Miyachi et al. Applicants have failed to present any arguments addressing the combination of Begin et al. with Miyachi et al., Nakayama et al., Kawasaki et al., and Codama, as applied supra and in the previous Office action.

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Applicant's amendment necessitated the new grounds of rejection. Accordingly, **THIS ACTION IS MADE FINAL**. See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Wilczewski whose telephone number is (703) 308-2771. The examiner can normally be reached on Monday, Thursday, and Friday from 6:30 pm to 3:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 308-2546. The fax phone number for this Group is (703) 305-3600.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.



MARY WILCZEWSKI
PRIMARY EXAMINER
GROUP 1100

M. Wilczewski:rg
January 17, 1996